# PK03005_PGC1KG_FBG256

## （版本号：Version1.3）

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深圳市紫光同创电子有限公司

# 文档版本修订记录

| 版本号 | 发布日期 | 修订记录 |
|---|---|---|
| V1.0 | 2019/03/01 | 初次发行 |
| V1.1 | 2019/04/10 | 修订表 3，删除 IO 信号的后缀_S 或_P |
| V1.2 | 2019/07/09 | 修订表 2，更新管脚说明，删除测试管脚，PGC1300G 变更为 PGC1KG |
| V1.3 | 2019/08/21 | 修订表 2，更新用户 IO 的状态描述 |
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## 名词术语解释

POD ： Package Outline Drawing

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# 一、 封装介绍

PGC1KG_FBG256 产品采用 Wire bond 打线球栅阵列封装形式。其封装尺寸为 17x17mm，植球数量为 256，植球间距为 1.0mm，最大封装厚度为 1.43mm。

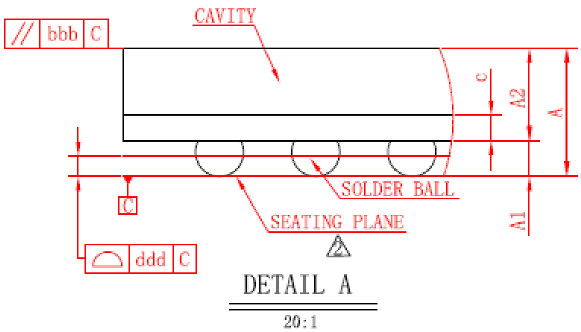
# 二、 封装尺寸和管脚

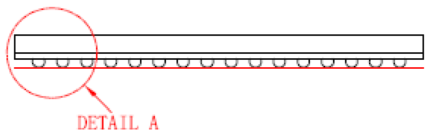
## （一） 封装外形尺寸

表 1 外形尺寸数值表

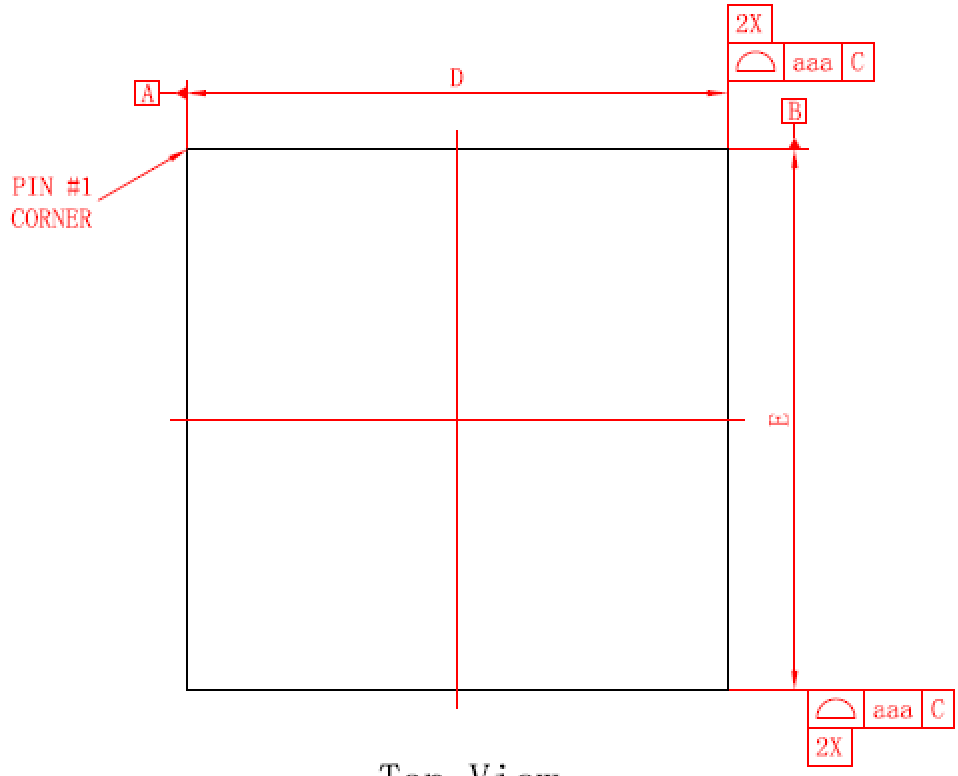
单位为毫米

| 尺寸符号 | 数值 | | | 尺寸符号 | 数值 | | |
|---|---|---|---|---|---|---|---|
| | 最 小 | 典型值 | 最 大 | | 最 小 | 典型值 | 最 大 |
| D | 16.9 | 17.0 | 17.1 | A | 1.23 | 1.33 | 1.43 |
| D1 | n/a | 15.0 | n/a | A1 | 0.32 | 0.37 | 0.42 |
| E | 16.9 | 17.0 | 17.1 | A2 | 0.91 | 0.96 | 1.01 |
| E1 | n/a | 15.0 | n/a | c | 0.22 | 0.26 | 0.3 |
| b | 0.45 | 0.5 | 0.55 | e | n/a | 1.0 | n/a |

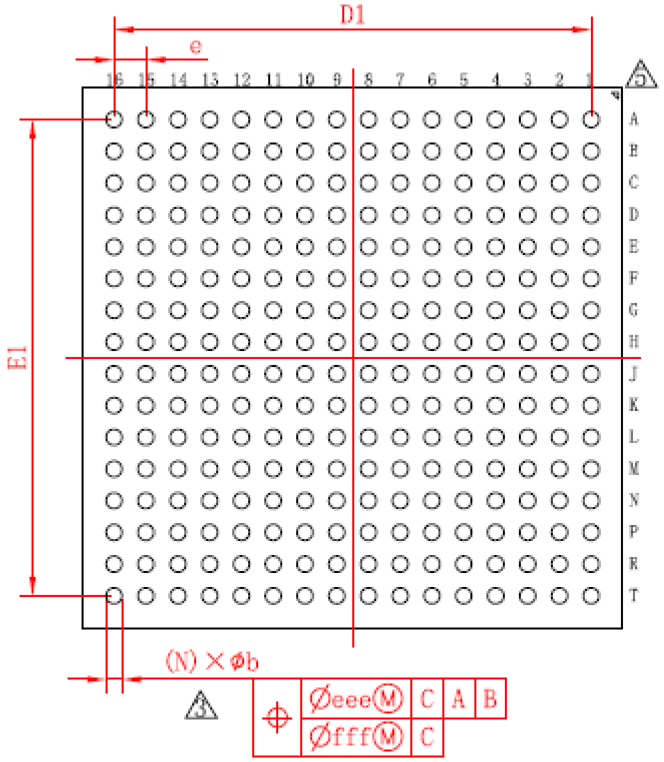


Side View




Top View




Bottom View

图 1 外形尺寸图(POD)

## （二） 管脚说明

PGC1KG_FBG256 产品的 user IO 数为 207。

表 2 产品管脚定义

| 管脚名称 | 管脚类型 | 方向 | 管脚说明 |
|---|---|---|---|
| 用户 I/O 管脚 | | | |
| DIFF[I,IO]_XX_NN[P,N] | 专用管脚 | 输入/输出 | 普通用户 I/O。<br>（1）DIFFI，表示支持差分信号输入和伪差分输出；DIFFIO，表示支持差分信号输入和真差分输出，能够用于 LVDS 类型的信号发送和接收；<br>（2）“XX”，表示 Bank 序号，可取 B0，B1，B2，B3，B4，B5；<br>（3）“NN”，表示 Bank 内可编程 I/O 组的序号，从 0 开始递增；<br>（4）[P,N]:“P”表示差分对的正端，“N”表示差分对的负端；<br>上电复位期间，普通用户 I/O 为低电平；<br>完成上电复位但未配置时，普通用户 I/O 状态为下拉；<br>配置期间，普通用户 I/O 状态为下拉； |
| 配置[1] | | | |
| INIT_FLAG_N | 复用管脚 | 双向（开漏） | 配置状态复用管脚，当做配置管脚时：<br>上电复位期间，为低电平；<br>完成上电复位但未配置时，为开漏，弱上拉；<br>在配置过程中，为开漏，弱上拉；<br>在初始化过程中，该管脚可以由外部输入低电平，用于指示错误或者延迟配置。在配置过程中，该管脚作为配置错误的指示状态输出，为低表示配置过程中出现错误； |
| CFG_DONE | 复用管脚 | 双向（开漏） | 配置状态复用管脚，内置弱上拉电阻，当做配置管脚时，作为配置完成指示状态输出，为高表示配置完成；<br>在配置之前或者配置过程中该管脚被驱动为低电平；在配置完成后，该管脚可以由外部继续驱动为低电平，一旦内部启动时序发现 CFG_DONE 为低电平，那么内部的启动电路继续保持直到 CFG_DONE 变为高电平才会继续执行启动过程； |
| RSTN | 复用管脚 | 输入 | 复用的复位管脚，内置弱上拉电阻，当做复位管脚时，用于重新启动配置流程，低有效；<br>建议用户在使用过程中在芯片外部用电阻上拉 RSTN（内部弱上拉电阻的阻值一般为 |

| 管脚名称 | 管脚类型 | 方向 | 管脚说明 |
|---|---|---|---|
| | | | 20kOhms 以上，上拉强度较弱）；当该管脚为低电平，FPGA 进入复位状态，所有的 I/O 处于弱下拉； |
| CFG_CLK | 复用管脚 | 输入/输出 | 配置复用时钟管脚，内置弱上拉电阻，当做配置管脚时：<br>在从 SPI 配置模式，该管脚作为时钟输入以从外部获取配置数据；<br>在主 SPI 配置模式，该管脚作为时钟输出以从外部获取配置数据，在此模式，需外接 1kOhms 上拉电阻；<br>主 SPI 模式和从 SPI 模式允许同时可用，但是不允许同时用这两种模式访问； |
| TCK | 复用管脚 | 输入 | 复用 JTAG 测试时钟时钟输入管脚；需外接 4.7kOhms 的下拉电阻； |
| TMS | 复用管脚 | 输入 | 复用 JTAG 测试模式选择输入管脚；内置弱上拉电阻，上拉到 VCCIO0； |
| TDI | 复用管脚 | 输入 | 复用 JTAG 测试数据输入管脚；内置弱上拉电阻，上拉到 VCCIO0； |
| TDO | 复用管脚 | 输出 | 复用 JTAG 测试数据输出管脚。内置弱上拉电阻，上拉到 VCCIO0； |
| JTAGEN | 复用管脚 | 输入 | 可选的 JTAG 端口行为控制管脚，该功能只在用户模式下可用，即在配置模式下，该端口为用户 I/O，默认状态为弱下拉；<br>在用户模式下，<br>当 JTAG 管脚配置为配置 I/O 时，该端口为用户 I/O，状态由用户控制；<br>当 JTAG 管脚作为用户 I/O 时，JTAGEN 变成了专用输入，用来控制 JTAG 管脚是否可用；默认状态为弱下拉；<br>在 JTAGEN 为专用 I/O 的情况下：<br>（1）当为低电平，JTAG 管脚作为普通用户 I/O 功能；<br>（2）当为高电平，JTAG 管脚作为 JTAG 配置管脚的功能； |
| FCS_N | 复用管脚 | 输出 | 复用配置管脚，外部主 SPI 配置模式使用，<br>（1）主 SPI 模式下，低有效输出片选信号给外部 Flash；<br>（2）配置完成后，可以作为用户 I/O 使用； |
| MISO_SO | 复用管脚 | 输入/输出 | 复用 SPI 配置管脚；<br>（1）MISO，主 SPI 模式串行数据输入；<br>（2）SO，从 SPI 模式串行数据输出；<br>主 SPI 模式和从 SPI 模式允许同时可用， |

| 管脚名称 | 管脚类型 | 方向 | 管脚说明 |
|---|---|---|---|
| | | | 但是不允许同时用这两种模式访问； |
| MOSI_SI | 复用管脚 | 输入/输出 | 复用 SPI 配置管脚；<br>（1）MOSI，主 SPI 模式串行数据输出<br>（2）SI，从 SPI 模式串行数据输入；<br>主 SPI 模式和从 SPI 模式允许同时可用，但是不允许同时用这两种模式访问； |
| FCSI_N | 复用管脚 | 输入 | 复用 SPI 配置管脚，内置弱上拉电阻；<br>从 SPI 模式，低有效片选输入； |
| SCL | 复用管脚 | 输入（开漏） | 从 I2C 模式时钟输入；需要外接弱上拉电阻； |
| SDA | 复用管脚 | 输入/输出（开漏） | I2C 模式数据输入/输出；需要外接弱上拉电阻； |
| SPAL_CLK | 复用管脚 | 输入 | 从并 X16 配置方式的时钟输入； |
| SPAL_CS_N | 复用管脚 | 输入 | 从并 X16 配置方式的使能输入； |
| SPAL_RDWR_N | 复用管脚 | 输入 | 从并 X16 配置方式的读写控制输入；<br>1：读；0：写； |
| SPAL_BUSY | 复用管脚 | 输出 | 从并 X16 配置方式的忙碌指示位；<br>回读期间，如果数据没准备好，则 SPAL_BUSY 变高； |
| SPAL_D15~SPAL_D0 | 复用管脚 | 输入/输出 | 从并 X16 配置方式的数据总线； |
| 时钟，PLL | | | |
| CLK[0,1,2][P,N]_[B0,B1,⋯,B5] | 复用管脚 | 输入 | 专用全局时钟输入管脚；还可以作为普通用户 I/O 使用。每个 Bank 提供 0~3 个管脚；<br>（1）[0，1，2]：时钟管脚序号；<br>（2）[P,N]：时钟管脚互补差分的正端和负端；<br>（3）[B0,B1,⋯,B5]：Bank 序号； |
| PLL[0,1]_CLKIN_[P,N] | 复用管脚 | 输入 | 可选的 PLL 输入，PLL 可以选择从这些管脚直接输入时钟；其还可以作为普通用户 I/O 使用；<br>（1）[0,1]：对应 PLL0 和 PLL1；<br>（2）[P,N]：时钟管脚互补差分的正端和负端； |
| PLL[0,1]_CLKFB_[P,N] | 复用管脚 | 输入 | 可选的 PLL 反馈时钟输入，PLL 可以选择从这些管脚来外部反馈时钟；其还可以作为普通用户 I/O 使用；<br>（1）[0,1]：对应 PLL0 和 PLL1；<br>（2）[P,N]：时钟管脚互补差分的正和负端； |
| 电源 | | | |
| VCC | | 电源 | 外部供电电源，支持 2.5V 或 3.3V，给内核逻辑提供电源； |

| 管脚名称 | 管脚类型 | 方向 | 管脚说明 |
|---|---|---|---|
| VCCIO[0,1,2,3,4,5] | | 电源 | I/O Bank 电源； |
| VSS | | 地 | 与 VCC 相关的地； |

注: 1. 配置的复用管脚当做用户 I/O 时，状态与用户 I/O 管脚相同

# 1. Pinout Diagram

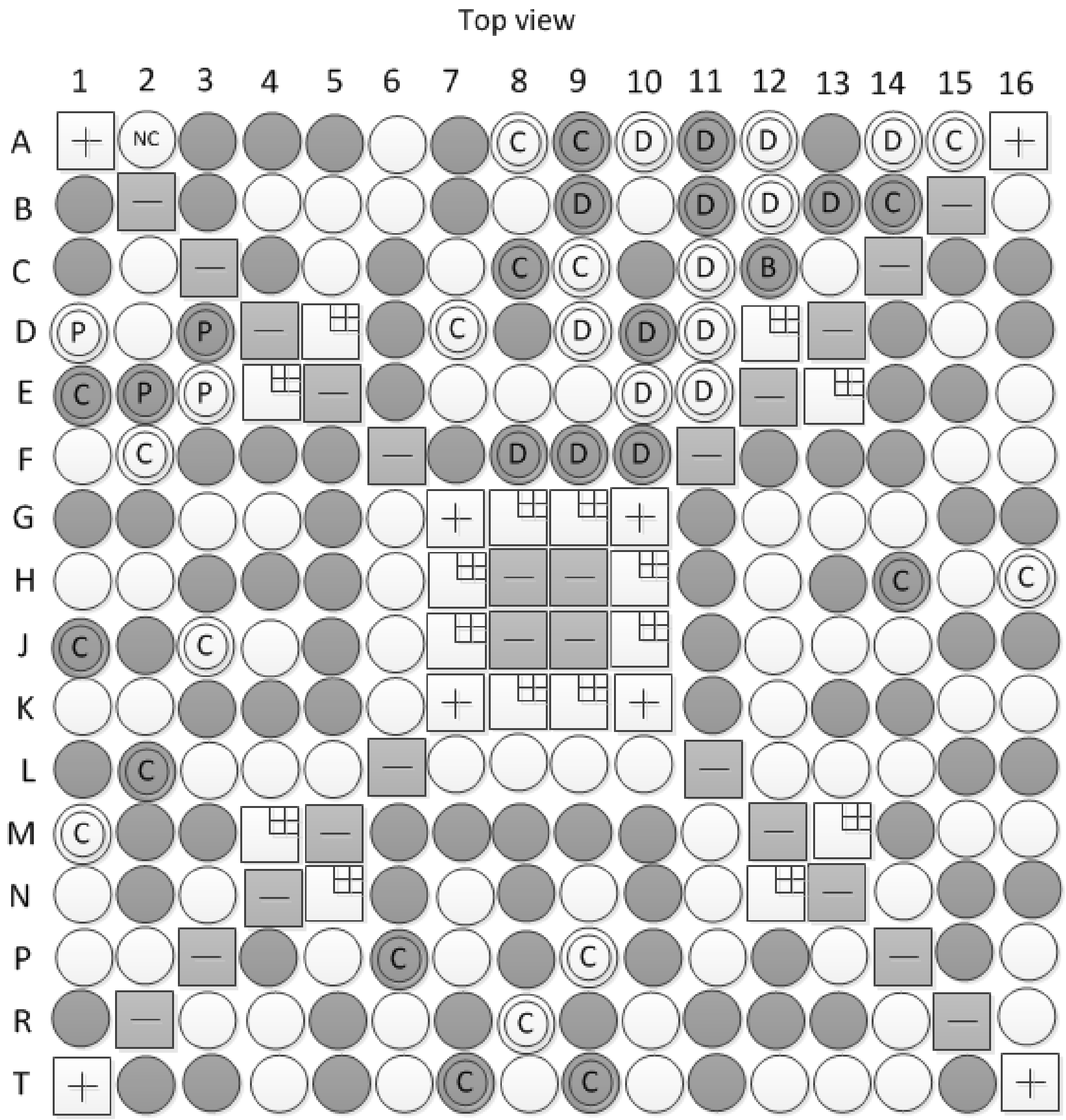
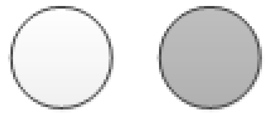
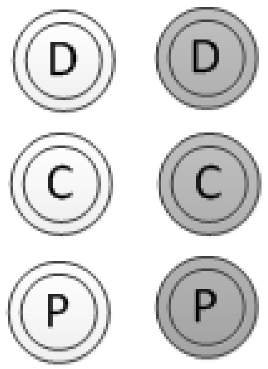
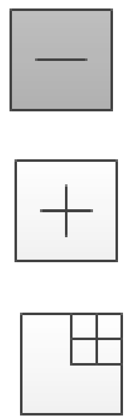



图 2 Pinout Diagram

备注：Pinout 符号代表说明如下：

| | | |
|---|---|---|
| 普通IO | DIFFIO* | COMP(N) TRUE(P)<br> |
| 复用IO | DIFFIO*/D0~D31<br>DIFFIO*/CLK*<br>DIFFIO*/PLL* |  |
| 电源、地 | VSS<br>VCC<br>VCCIO |  |

## 2. IO Banks

Top view

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | |
| B | B5 | | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | | B1 |
| C | B5 | B5 | | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | B0 | | B1 | B1 |
| D | B5 | B5 | B5 | | | B0 | B0 | B0 | B0 | B0 | B0 | | | B1 | B1 | B1 |
| E | B5 | B5 | B5 | | | B0 | B0 | B0 | B0 | B0 | B0 | | | B1 | B1 | B1 |
| F | B5 | B5 | B5 | B5 | B5 | | B0 | B0 | B0 | B0 | | B1 | B1 | B1 | B1 | B1 |
| G | B4 | B5 | B5 | B5 | B5 | B5 | | | | | B1 | B1 | B1 | B1 | B1 | B1 |
| H | B4 | B4 | B4 | B4 | B4 | B5 | | | | | B1 | B1 | B1 | B1 | B1 | B1 |
| J | B4 | B4 | B4 | B4 | B4 | B4 | | | | | B1 | B1 | B1 | B1 | B1 | B1 |
| K | B4 | B4 | B4 | B3 | B3 | B4 | | | | | B1 | B1 | B1 | B1 | B1 | B1 |
| L | B3 | B3 | B3 | B3 | B3 | | B2 | B2 | B2 | B2 | | B1 | B1 | B1 | B1 | B1 |
| M | B3 | B3 | B3 | | | B2 | B2 | B2 | B2 | B2 | B2 | | | B1 | B1 | B1 |
| N | B3 | B3 | B3 | | | B2 | B2 | B2 | B2 | B2 | B2 | | | B1 | B1 | B1 |
| P | B3 | B3 | | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | | B1 | B1 |
| R | B3 | | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | | B1 |
| T | | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | B2 | |

图 3 IO Banks

## 3. Power and GND Placement

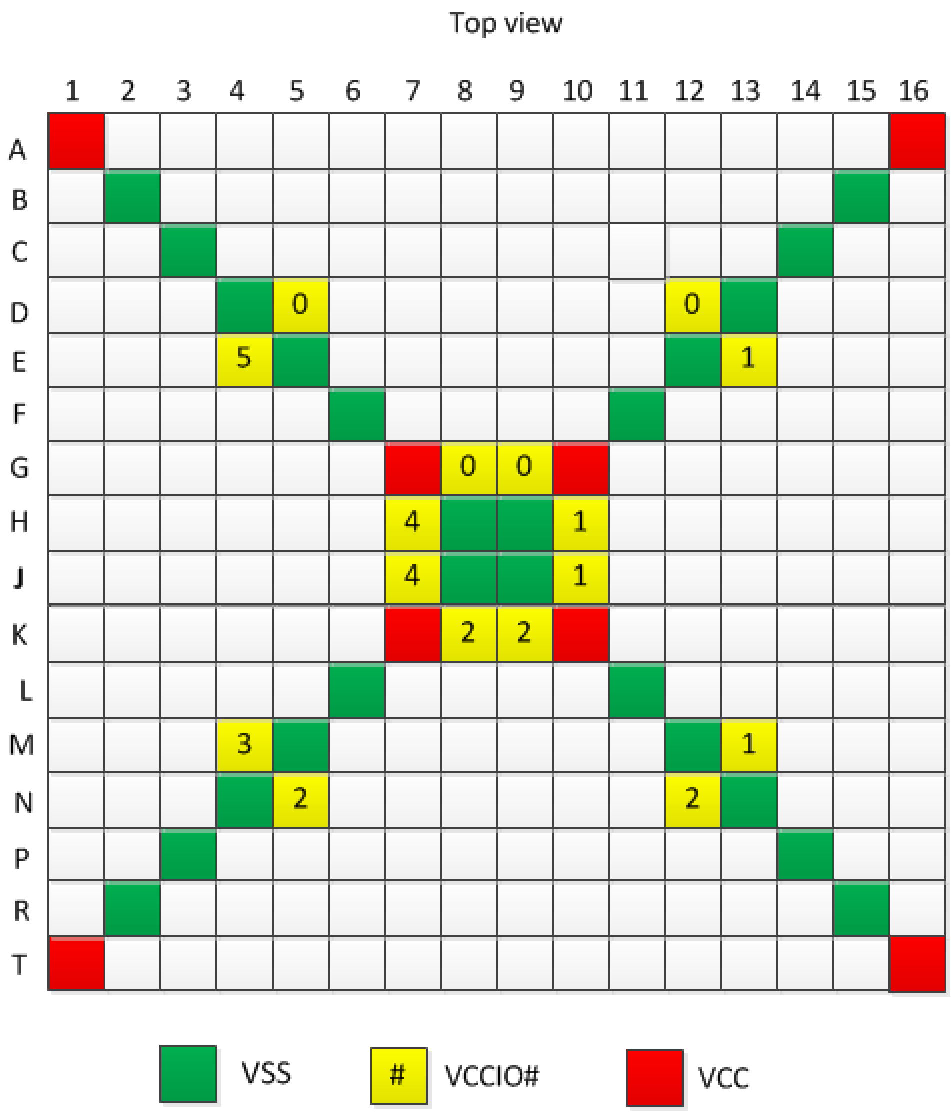



图 4 Power and GND Placement

## 4. Ball name list

表 3 Ball name list

| Bank Name | Ball name(Function name) | Ball Number | 差分对 | Time Delay(ps) |
|---|---|---|---|---|
| B0 | DIFFI_B0_0N/CFG_DONE | C13 | IO_1_N | 71.48 |
| B0 | DIFFI_B0_0P/INIT_FLAG_N | A13 | IO_1_P | 74.62 |
| B0 | DIFFIO_B0_1N/SPAL_CLK | A15 | IO_2_N | 83.95 |
| B0 | DIFFIO_B0_1P/SPAL_CS_N | B14 | IO_2_P | 82.3 |
| B0 | DIFFIO_B0_3N/SPAL_RDWR_N | B12 | IO_4_N | 60.25 |
| B0 | DIFFIO_B0_3P/SPAL_BUSY | C12 | IO_4_P | 49.57 |
| B0 | DIFFI_B0_4N/SPAL_D15 | A14 | IO_5_N | 71.99 |
| B0 | DIFFI_B0_4P/SPAL_D14 | B13 | IO_5_P | 87.43 |
| B0 | DIFFIO_B0_5N/SPAL_D13 | A12 | IO_6_N | 72.11 |
| B0 | DIFFIO_B0_5P/SPAL_D12 | B11 | IO_6_P | 68.13 |
| B0 | DIFFI_B0_6N/SPAL_D11 | D11 | IO_7_N | 61.66 |
| B0 | DIFFI_B0_6P/SPAL_D10 | F10 | IO_7_P | 60.91 |
| B0 | DIFFIO_B0_7N/SPAL_D9 | C11 | IO_8_N | 68.72 |
| B0 | DIFFIO_B0_7P/SPAL_D8 | A11 | IO_8_P | 69.88 |
| B0 | DIFFI_B0_8N/RSTN | B10 | IO_9_N | 58.51 |
| B0 | DIFFI_B0_8P/JTAGEN | C10 | IO_9_P | 55.46 |
| B0 | DIFFIO_B0_9N/SPAL_D7 | E10 | IO_10_N | 51.99 |
| B0 | DIFFIO_B0_9P/SPAL_D6 | D10 | IO_10_P | 50.35 |
| B0 | DIFFI_B0_10N/SPAL_D5 | E11 | IO_11_N | 65.63 |
| B0 | DIFFI_B0_10P/SPAL_D4 | F9 | IO_11_P | 64.33 |
| B0 | DIFFIO_B0_11N/SPAL_D3 | A10 | IO_12_N | 68.4 |
| B0 | DIFFIO_B0_11P/SPAL_D2 | B9 | IO_12_P | 66.67 |
| B0 | DIFFI_B0_12N/SDA/CLK0N_B0 | C9 | IO_13_N | 70.19 |
| B0 | DIFFI_B0_12P/SCL/CLK0P_B0 | A9 | IO_13_P | 69.89 |
| B0 | DIFFIO_B0_13N/SPAL_D1 | D9 | IO_14_N | 46.91 |
| B0 | DIFFIO_B0_13P/SPAL_D0 | F8 | IO_14_P | 48.34 |
| B0 | DIFFI_B0_14N | E9 | IO_15_N | 38.98 |
| B0 | DIFFI_B0_14P | D8 | IO_15_P | 50.07 |
| B0 | DIFFIO_B0_15N/CLK1N_B0 | A8 | IO_16_N | 67.13 |

| | | | | |
|---|---|---|---|---|
| B0 | DIFFIO_B0_15P/CLK1P_B0 | C8 | IO_16_P | 67.65 |
| B0 | DIFFI_B0_16N/TMS | B8 | IO_17_N | 64.92 |
| B0 | DIFFI_B0_16P/TCK | A7 | IO_17_P | 67.73 |
| B0 | DIFFIO_B0_17N | E8 | IO_18_N | 43.04 |
| B0 | DIFFIO_B0_17P | F7 | IO_18_P | 32.46 |
| B0 | DIFFI_B0_18N | D7 | IO_19_N | 56.94 |
| B0 | DIFFI_B0_18P | E6 | IO_19_P | 57.01 |
| B0 | DIFFIO_B0_19N | C7 | IO_20_N | 45.35 |
| B0 | DIFFIO_B0_19P | B7 | IO_20_P | 47.17 |
| B0 | DIFFI_B0_20N/TDI | A6 | IO_21_N | 59.58 |
| B0 | DIFFI_B0_20P/TDO | C6 | IO_21_P | 68.69 |
| B0 | DIFFIO_B0_21N | E7 | IO_22_N | 52.42 |
| B0 | DIFFIO_B0_21P | D6 | IO_22_P | 49.08 |
| B0 | DIFFI_B0_22N | B4 | IO_23_N | 93.33 |
| B0 | DIFFI_B0_22P | A3 | IO_23_P | 78.43 |
| B0 | DIFFIO_B0_23N | B6 | IO_24_N | 68.04 |
| B0 | DIFFIO_B0_23P | A5 | IO_24_P | 70.63 |
| B0 | DIFFIO_B0_25N | C5 | IO_26_N | 71.88 |
| B0 | DIFFIO_B0_25P | A4 | IO_26_P | 73.97 |
| B0 | DIFFI_B0_26P | B3 | IO_27_P | 68.27 |
| B0 | DIFFIO_B0_27N | B5 | IO_28_N | 73.76 |
| B0 | DIFFIO_B0_27P | C4 | IO_28_P | 74.05 |
| B1 | DIFFI_B1_0P | D14 | IO_29_P | 78.1 |
| B1 | DIFFI_B1_0N | E15 | IO_29_N | 78.45 |
| B1 | DIFFI_B1_1P | C15 | IO_30_P | 88.6 |
| B1 | DIFFI_B1_1N | B16 | IO_30_N | 93.49 |
| B1 | DIFFI_B1_2P | D16 | IO_31_P | 77.26 |
| B1 | DIFFI_B1_2N | E14 | IO_31_N | 71.73 |
| B1 | DIFFI_B1_3P | C16 | IO_32_P | 96.53 |
| B1 | DIFFI_B1_3N | D15 | IO_32_N | 98.34 |
| B1 | DIFFI_B1_4P | E16 | IO_33_P | 73.5 |
| B1 | DIFFI_B1_4N | F15 | IO_33_N | 74.04 |
| B1 | DIFFI_B1_5P | F13 | IO_34_P | 57.03 |

| | | | | |
|---|---|---|---|---|
| B1 | DIFFI_B1_5N | G12 | IO_34_N | 55.57 |
| B1 | DIFFI_B1_6P | F14 | IO_35_P | 65.96 |
| B1 | DIFFI_B1_6N | F16 | IO_35_N | 58.35 |
| B1 | DIFFI_B1_7P | F12 | IO_36_P | 55.38 |
| B1 | DIFFI_B1_7N | G13 | IO_36_N | 57.4 |
| B1 | DIFFI_B1_8P | G15 | IO_37_P | 57.45 |
| B1 | DIFFI_B1_8N | G14 | IO_37_N | 54.67 |
| B1 | DIFFI_B1_9P | G11 | IO_38_P | 54.52 |
| B1 | DIFFI_B1_9N | H12 | IO_38_N | 53.3 |
| B1 | DIFFI_B1_10P | G16 | IO_39_P | 56.27 |
| B1 | DIFFI_B1_10N | H15 | IO_39_N | 64.83 |
| B1 | DIFFI_B1_11P | H13 | IO_40_P | 55.98 |
| B1 | DIFFI_B1_11N | J12 | IO_40_N | 54.16 |
| B1 | DIFFI_B1_12P/CLK0P_B1 | H14 | IO_41_P | 66.46 |
| B1 | DIFFI_B1_12N/CLK0N_B1 | H16 | IO_41_N | 68.17 |
| B1 | DIFFI_B1_13P | J16 | IO_42_P | 67.18 |
| B1 | DIFFI_B1_13N | J14 | IO_42_N | 65.16 |
| B1 | DIFFI_B1_14P | J15 | IO_43_P | 53.99 |
| B1 | DIFFI_B1_14N | K16 | IO_43_N | 68.37 |
| B1 | DIFFI_B1_15P | H11 | IO_44_P | 55.66 |
| B1 | DIFFI_B1_15N | J13 | IO_44_N | 51.92 |
| B1 | DIFFI_B1_16P | K14 | IO_45_P | 55.66 |
| B1 | DIFFI_B1_16N | K15 | IO_45_N | 48.74 |
| B1 | DIFFI_B1_17P | J11 | IO_46_P | 55.52 |
| B1 | DIFFI_B1_17N | L12 | IO_46_N | 55.17 |
| B1 | DIFFI_B1_18P | L16 | IO_47_P | 57.65 |
| B1 | DIFFI_B1_18N | L14 | IO_47_N | 65.67 |
| B1 | DIFFI_B1_19P | K13 | IO_48_P | 39.7 |
| B1 | DIFFI_B1_19N | K12 | IO_48_N | 41.69 |
| B1 | DIFFI_B1_20P | L15 | IO_49_P | 71.64 |
| B1 | DIFFI_B1_20N | M16 | IO_49_N | 72.5 |
| B1 | DIFFI_B1_21P | K11 | IO_50_P | 51.15 |
| B1 | DIFFI_B1_21N | L13 | IO_50_N | 55.42 |

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|---|---|---|---|---|
| B1 | DIFFI_B1_22P | M14 | IO_51_P | 53.25 |
| B1 | DIFFI_B1_22N | M15 | IO_51_N | 65.07 |
| B1 | DIFFI_B1_23P | N15 | IO_52_P | 87.1 |
| B1 | DIFFI_B1_23N | P16 | IO_52_N | 74.54 |
| B1 | DIFFI_B1_24P | N16 | IO_53_P | 75.83 |
| B1 | DIFFI_B1_24N | N14 | IO_53_N | 73.6 |
| B1 | DIFFI_B1_25P | P15 | IO_54_P | 82.59 |
| B1 | DIFFI_B1_25N | R16 | IO_54_N | 79.2 |
| B2 | DIFFI_B2_0N | R14 | IO_55_N | 87.19 |
| B2 | DIFFI_B2_0P | T15 | IO_55_P | 90.03 |
| B2 | DIFFI_B2_1N/MOSI_SI | P13 | IO_56_N | 75.56 |
| B2 | DIFFI_B2_1P/FCSI_N | R12 | IO_56_P | 78.98 |
| B2 | DIFFI_B2_3N | T13 | IO_58_N | 77.26 |
| B2 | DIFFI_B2_3P | P12 | IO_58_P | 71.11 |
| B2 | DIFFI_B2_4N | T14 | IO_59_N | 93.04 |
| B2 | DIFFI_B2_4P | R13 | IO_59_P | 94.28 |
| B2 | DIFFI_B2_5N | T12 | IO_60_N | 73.1 |
| B2 | DIFFI_B2_5P | R11 | IO_60_P | 72.32 |
| B2 | DIFFI_B2_6N | N11 | IO_61_N | 56.07 |
| B2 | DIFFI_B2_6P | M10 | IO_61_P | 50.87 |
| B2 | DIFFI_B2_7N | P11 | IO_62_N | 68.28 |
| B2 | DIFFI_B2_7P | T11 | IO_62_P | 59.59 |
| B2 | DIFFI_B2_8N | M11 | IO_63_N | 58.45 |
| B2 | DIFFI_B2_8P | N10 | IO_63_P | 58.95 |
| B2 | DIFFI_B2_9N | R10 | IO_64_N | 48.55 |
| B2 | DIFFI_B2_9P | P10 | IO_64_P | 55.62 |
| B2 | DIFFI_B2_10N | L10 | IO_65_N | 56.75 |
| B2 | DIFFI_B2_10P | M9 | IO_65_P | 53.03 |
| B2 | DIFFI_B2_11N | T10 | IO_66_N | 66.42 |
| B2 | DIFFI_B2_11P | R9 | IO_66_P | 63.43 |
| B2 | DIFFI_B2_12N | N9 | IO_67_N | 59.46 |
| B2 | DIFFI_B2_12P | M8 | IO_67_P | 56.73 |
| B2 | DIFFI_B2_13N/CLK1N_B2 | P9 | IO_68_N | 65.96 |

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|---|---|---|---|---|
| B2 | DIFFI_B2_13P/CLK1P_B2 | T9 | IO_68_P | 64.59 |
| B2 | DIFFI_B2_14N | L9 | IO_69_N | 58.06 |
| B2 | DIFFI_B2_14P | N8 | IO_69_P | 57.25 |
| B2 | DIFFI_B2_15N | T8 | IO_70_N | 69.15 |
| B2 | DIFFI_B2_15P | P8 | IO_70_P | 62.93 |
| B2 | DIFFI_B2_16N | L8 | IO_71_N | 64.7 |
| B2 | DIFFI_B2_16P | M6 | IO_71_P | 64.79 |
| B2 | DIFFI_B2_17N/CLK0N_B2 | R8 | IO_72_N | 64.73 |
| B2 | DIFFI_B2_17P/CLK0P_B2 | T7 | IO_72_P | 67.5 |
| B2 | DIFFI_B2_18N | N7 | IO_73_N | 54.49 |
| B2 | DIFFI_B2_18P | M7 | IO_73_P | 57.72 |
| B2 | DIFFI_B2_19N | P7 | IO_74_N | 62.7 |
| B2 | DIFFI_B2_19P | R7 | IO_74_P | 52.91 |
| B2 | DIFFI_B2_20N | L7 | IO_75_N | 56.14 |
| B2 | DIFFI_B2_20P | N6 | IO_75_P | 56.69 |
| B2 | DIFFI_B2_21N/MISO_SO | T6 | IO_76_N | 73.93 |
| B2 | DIFFI_B2_21P/CFG_CLK | P6 | IO_76_P | 64.08 |
| B2 | DIFFI_B2_22N | R4 | IO_77_N | 79.66 |
| B2 | DIFFI_B2_22P | T3 | IO_77_P | 85.19 |
| B2 | DIFFI_B2_23N | R6 | IO_78_N | 71.92 |
| B2 | DIFFI_B2_23P | T5 | IO_78_P | 70.98 |
| B2 | DIFFI_B2_25N | P5 | IO_80_N | 66.93 |
| B2 | DIFFI_B2_25P/FCS_N | R5 | IO_80_P | 69.46 |
| B2 | DIFFI_B2_26N | R3 | IO_81_N | 86.81 |
| B2 | DIFFI_B2_26P | T2 | IO_81_P | 83.59 |
| B2 | DIFFI_B2_27N | T4 | IO_82_N | 78.56 |
| B2 | DIFFI_B2_27P | P4 | IO_82_P | 72.9 |
| B3 | DIFFI_B3_0P | L1 | IO_83_P | 57.18 |
| B3 | DIFFI_B3_0N | L3 | IO_83_N | 70.22 |
| B3 | DIFFI_B3_1P | K4 | IO_84_P | 57.69 |
| B3 | DIFFI_B3_1N | L5 | IO_84_N | 57.75 |
| B3 | DIFFI_B3_2P/CLK0P_B3 | L2 | IO_85_P | 69.71 |
| B3 | DIFFI_B3_2N/CLK0N_B3 | M1 | IO_85_N | 72.16 |

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|---|---|---|---|---|
| B3 | DIFFI_B3_3P | K5 | IO_86_P | 44.9 |
| B3 | DIFFI_B3_3N | L4 | IO_86_N | 35.01 |
| B3 | DIFFI_B3_4P | M3 | IO_87_P | 66.17 |
| B3 | DIFFI_B3_4N | N1 | IO_87_N | 72.48 |
| B3 | DIFFI_B3_5P | N2 | IO_88_P | 76.98 |
| B3 | DIFFI_B3_5N | P1 | IO_88_N | 78.17 |
| B3 | DIFFI_B3_6P | M2 | IO_89_P | 68.51 |
| B3 | DIFFI_B3_6N | N3 | IO_89_N | 63.74 |
| B3 | DIFFI_B3_7P | R1 | IO_90_P | 83.97 |
| B3 | DIFFI_B3_7N | P2 | IO_90_N | 78.48 |
| B4 | DIFFI_B4_0P | G1 | IO_91_P | 61.81 |
| B4 | DIFFI_B4_0N | H2 | IO_91_N | 49.43 |
| B4 | DIFFI_B4_1P | H4 | IO_92_P | 57.88 |
| B4 | DIFFI_B4_1N | J6 | IO_92_N | 55.55 |
| B4 | DIFFI_B4_2P | H3 | IO_93_P | 61.65 |
| B4 | DIFFI_B4_2N | H1 | IO_93_N | 53.6 |
| B4 | DIFFI_B4_3P/CLK0P_B4 | J1 | IO_94_P | 68.36 |
| B4 | DIFFI_B4_3N/CLK0N_B4 | J3 | IO_94_N | 63.18 |
| B4 | DIFFI_B4_4P | J2 | IO_95_P | 68.78 |
| B4 | DIFFI_B4_4N | K1 | IO_95_N | 67.66 |
| B4 | DIFFI_B4_5P | H5 | IO_96_P | 54.22 |
| B4 | DIFFI_B4_5N | J4 | IO_96_N | 54.94 |
| B4 | DIFFI_B4_6P | K3 | IO_97_P | 42.19 |
| B4 | DIFFI_B4_6N | K2 | IO_97_N | 58.68 |
| B4 | DIFFI_B4_7P | J5 | IO_98_P | 44.45 |
| B4 | DIFFI_B4_7N | K6 | IO_98_N | 54.48 |
| B5 | DIFFI_B5_0P/PLL0_CLKFB_P | D3 | IO_99_P | 73.81 |
| B5 | DIFFI_B5_0N/PLL0_CLKFB_N | D1 | IO_99_N | 79.97 |
| B5 | DIFFI_B5_1P | B1 | IO_100_P | 79.76 |
| B5 | DIFFI_B5_1N | C2 | IO_100_N | 71.03 |
| B5 | DIFFI_B5_2P/PLL0_CLKIN_P | E2 | IO_101_P | 67.59 |
| B5 | DIFFI_B5_2N/PLL0_CLKIN_N | E3 | IO_101_N | 51.7 |
| B5 | DIFFI_B5_3P | C1 | IO_102_P | 69.93 |

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|---|---|---|---|---|
| B5 | DIFFI_B5_3N | D2 | IO_102_N | 76.79 |
| B5 | DIFFI_B5_4P/CLK0P_B5 | E1 | IO_103_P | 72.86 |
| B5 | DIFFI_B5_4N/CLK0N_B5 | F2 | IO_103_N | 68 |
| B5 | DIFFI_B5_5P | F4 | IO_104_P | 51.79 |
| B5 | DIFFI_B5_5N | G6 | IO_104_N | 55.12 |
| B5 | DIFFI_B5_6P | F3 | IO_105_P | 60.8 |
| B5 | DIFFI_B5_6N | F1 | IO_105_N | 73.66 |
| B5 | DIFFI_B5_7P | G5 | IO_106_P | 60.47 |
| B5 | DIFFI_B5_7N | G4 | IO_106_N | 59.97 |
| B5 | DIFFI_B5_8P | G2 | IO_107_P | 58.51 |
| B5 | DIFFI_B5_8N | G3 | IO_107_N | 45.02 |
| B5 | DIFFI_B5_9P | F5 | IO_108_P | 62.07 |
| B5 | DIFFI_B5_9N | H6 | IO_108_N | 59.82 |
| | VCC | A1 | | |
| | VCC | A16 | | |
| | VCC | G7 | | |
| | VCC | G10 | | |
| | VCC | K7 | | |
| | VCC | K10 | | |
| | VCC | T1 | | |
| | VCC | T16 | | |
| | NC | A2 | | |
| B0 | VCCIO0 | D5 | | |
| B0 | VCCIO0 | D12 | | |
| B0 | VCCIO0 | G8 | | |
| B0 | VCCIO0 | G9 | | |
| B1 | VCCIO1 | E13 | | |
| B1 | VCCIO1 | H10 | | |
| B1 | VCCIO1 | J10 | | |
| B1 | VCCIO1 | M13 | | |
| B2 | VCCIO2 | K8 | | |
| B2 | VCCIO2 | K9 | | |
| B2 | VCCIO2 | N5 | | |

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|---|---|---|---|---|
| B2 | VCCIO2 | N12 | | |
| B3 | VCCIO3 | M4 | | |
| B4 | VCCIO4 | H7 | | |
| B4 | VCCIO4 | J7 | | |
| B2 | VCCIO5 | E4 | | |
| | VSS | B2 | | |
| | VSS | B15 | | |
| | VSS | C3 | | |
| | VSS | C14 | | |
| | VSS | D4 | | |
| | VSS | D13 | | |
| | VSS | E5 | | |
| | VSS | E12 | | |
| | VSS | F6 | | |
| | VSS | F11 | | |
| | VSS | H8 | | |
| | VSS | H9 | | |
| | VSS | J8 | | |
| | VSS | J9 | | |
| | VSS | L6 | | |
| | VSS | L11 | | |
| | VSS | M5 | | |
| | VSS | M12 | | |
| | VSS | N4 | | |
| | VSS | N13 | | |
| | VSS | P3 | | |
| | VSS | P14 | | |
| | VSS | R2 | | |
| | VSS | R15 | | |